Silent Features and Syntactic Analysis

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1. What are silent features?

The use of features to distinguish within a given class of expressions various subclasses is by now an accepted practice among syntacticians, as it has been for some time in phonology. For instance, if one wants to distinguish mass nouns from count nouns, it is convenient to add a feature [COUNT] to the grammar and to mark some of the nouns as [+COUNT] and the rest as [-COUNT]. Usually, features do not create a strict partitioning of the set of expressions to which they apply. For example, some nouns are both [+ COUNT] and [- COUNT].. Some overlap of the extensions of the feature values, so to speak, must be allowed. Note that this is in general not true in phonology. A phoneme is marked either positively or negatively for a given feature, but not both. However, a tacit assumption among syntacticians seems to be that the values for a syntactic feature may not pick out sets which completely overlap with one another, i.e. identical sets. One simply does not find syntactic descriptions which employ a binary feature [@F] such that every expression which is [+F] is also [-F]. In this paper, features such as [@F] will be referred to as "silent features".

Silent features should not be confused with the "covert categories" of Zwicky (1986). The latter are categories which are not expressed by the rules of inflectional morphology. For instance, the difference between past and present tense is morphologically marked in English, and hence we can say that [TENSE] is an overt category of English. On the other hand, the difference between transitive and intransitive verbs is not expressed by the rules of English inflectional morphology, and so transitivity is a covert category in that sense. However, it is by no means a silent category, of course, since the set of transitive verbs in English is not coextensive with the set of intransitive verbs. It is not hard to see that every silent feature is going to be a covert feature, but not vice versa. In a sense, silent features are maximally covert in the sense that they cannot be distinguished by their "extensions": the set of expressions that bears the + value is the same as the set of expressions that bears the - value. Borrowing a term from formal semantics, we might call such oppositions intensional.

Actually, my concern is mainly with features which are silent in a somewhat weaker sense: namely, features which DO pick out different sets of expressions, but not within certain domains. In other words, my concern is with features which are sometimes silent. Having made the observation that linguists typically do not invoke silent features, one might be tempted to reformulate it as a constraint on syntactic theory (Cooper 1986, cited in Zwicky 1985, 1986 has made just such a proposal):

(1) *The Silent Feature Constraint*

No grammar may employ silent features.

One might argue at this point that this constraint need not be stipulated as a special metacondition on syntactic theory, but could be made to follow from other more general methodological principles, such as Occam's Razor. In the case of features which never do any work, this seems to be the right way to go. However, the more interesting formulation of the constraint is the one which rules out any feature which is silent with respect to some category C (such that C[+F] does not pick out a different set of expressions than C[-F]). I am going to attack the strong interpretation of (1) from another direction. Rather than saying that it is superfluous, I will argue that it is wrong, given some relatively uncontroversial assumptions about syntactic metatheory.

2. German Adjective Agreement in GPSG.

The only current syntactic theory which has something interesting to say about agreement phenomena is Generalized Phrase Structure Grammar (or GPSG). Two basic principles govern the distribution of agreement features in syntactic trees, namely the Control Agreement Principle (CAP), and the Head Feature Convention (HFC). For an extensive discussion of these principles and their formalization, see Gazdar, Klein, Pullum and Sag (1985). For our purposes it is sufficient to note the following. Features come in several flavours: we have so-called head features, foot features and agreement features and general principles as well as language-specific stipulations (which may override the general principles) determine where these features may occur.

The HFC states that the head of a constituent has the same specifications for the head features as the mother node. If number is a head feature, this would explain why a plural noun phrase may not have a singular noun as its head. The CAP states that a functional expression has the same specifications for the agreement features as its argument. So if we view determiners as functional expressions taking nominals as their arguments, and number is also an agreement feature, then it is explained why a plural nominal may not be combined with a singular determiner.

With this in mind, let us now take a quick look at the facts of German adjective agreement, which have been discussed recently by Zwicky in a GPSG setting (see Zwicky 1985). In German, the morphological shape of the adjective is determined not just by the noun (as in most non-Germanic languages with adjective agreement, such as the Romance languages), but also by the type of the determiner. The agreement parameters are number, gender, case and determiner class, as the following examples show:

(2) Number agreement

alter Mann "old man"
alte Maenner "old men"

(3) Gender agreement

alter Mann "old man" (Masc)
alte Frau "old woman" (Fem)
altes Haus "old house" (Neut)

(4) Case agreement

alter Mann NOM
alten Mannes GEN
altem Manne DAT
alten Mann ACC

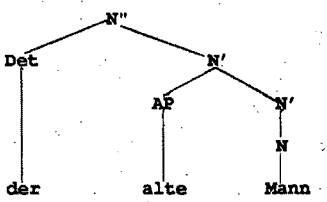
(5) Det-class agreement

alter Mann (zero determiner: class I)
der alte Mann "the old man" (der: class II)
kein alter Mann "no old man" (kein: class III)

alte Maenner "old men" (class I)
die alten Maenner "the old men" (class II)
keine alten Maenner "no old men" (class III)

(In (5), the first set of examples establishes the difference between class I and III on the one hand and class II on the other hand; the second set shows the difference between class I and class III.) I assume here, with Zwicky, that German noun phrases such as "der alte Mann" have the following structure:

(6)



The agreement facts can be described very elegantly if we assume that NPs are marked for the class-feature of their determiners and that this feature is a head and agreement feature. By the HFC, the N' and N nodes will have the same specification for this feature as the top node and by the CAP, the determiner and the adjective will receive this specification as well. Indirectly it is brought about that the adjective and the determiner agree. No special stipulations are needed, since all the work is done by the HFC and the CAP. Zwicky, however, does not choose this option, because the determiner-class feature would be silent for the nouns: in German, nouns are not distinguished with respect to the class of the determiner they take. (In addition, Zwicky argues that agreement features must be taken from a universal list of features with semantic content. The determiner-class feature has no clearcut semantic import. However, this requirement seems to be much too strong: it would rule out an account of gender and case agreement in terms of the CAP as well.) Instead of employing the CAP and HFC, Zwicky makes use of a parochial rule of Declension Government and another rule of Declension Inheritance. The first rule gives the N' sister of the determiner the same specification for the determiner-class feature as the determiner itself and the second one transmits this specification to the AP dominated by the N'.

In this way, there is no need to mark the noun for the feature as well. Note, however, that this analysis not only postulates rules which are not needed under the earlier account but also weakens the interest of the overall theory. The more we let parochial rules do the actual work, the less the explanatory load of the universal principles will be.

At this point, one might remark that my account predicts the possibility of there being a language in which the noun agrees with the determiner. This language would be just like German, except that the agreement feature is not silent. As a matter of fact, such languages exist: Norwegian (Lapointe 1984) and Arabic (Erwin 1963) have definiteness agreement markers on nouns.

To sum up: though the determiner-class feature is not overtly marked in German nouns, there is no reason to assume any incompatibility of this feature with those that characterize nouns. By allowing it as a silent feature, a simple and very general account of the German adjective agreement facts can be given. It seems fair to say that the prohibition of silent features prevents one here to achieve a goal which is considered highly desirable in linguistics, namely to derive the facts of a particular language from universal principles and minimal assumptions about the language in question.

3. Silent features elsewhere.

The determiner-class feature discussed in the preceding section is silent within the set of nouns, but not within the sets of adjectives and determiners. Features which are silent within some sets, but articulated within others are not as uncommon a sight as one might think. Consider for instance English subject-predicate agreement. It is usually said that the finite verb phrase in English agrees in number and person with the subject. However, the distinction between first and second person is overt only when the verb is 'be'. Suppose that we set up the person features in terms of two binary distinctions, one distinguishing the third person from the other two (as seems reasonable on semantic and syntactic grounds) and one which distinguishes the first from the second person. The latter feature is a silent feature for all verbs but 'be'. This verb has a number of properties which set it apart from most other verbs, for instance the fact that it is an auxiliary verb. For all verbs with the feature [-AUX], then, the opposition between first and second person is entirely covert. Within the auxiliary verbs, the opposition is covert for all verbs which do not have the feature [+COPULA].

A very similar story could be told about the English Case features, which must be assumed for noun phrases in order to describe the distribution of pronominals. However, for all non-pronominal NPs, the NOM/ACC distinction is covert and silent. Again, the simplest syntactic description sets up a feature which does not do any work in the majority of cases. One could try to get around this case by stipulating that ACC is the default case (following Gazdar, Klein, Pullum and Sag 1985), and that NOM is assigned only to subject pronouns (NPs with the feature [+PRO] agreeing with a finite verb phrase). However, that would entail a case marking system quite unlike that of other Indoeuropean languages. Furthermore, it still would not mean that there is no NOM/ACC

distinction in the nonpronominal noun phrases. Rather, nominative nonpronominal noun phrases would still be grammatical, but never used in the construction of grammatical sentences. This commits one to a rather baroque ontology, it appears.

My final example comes from English relative clauses. The relative pronoun *who* is usually considered to be a third-person pronoun, but it behaves like a first or second person NP whenever its antecedent is 'I' or 'you' respectively, as the agreement in the following examples shows:

(7) a. I who am your friend
b. You who are so bright

We must assume that the relative pronoun *who* agrees in person (and number) with its antecedent. However, the person and number distinctions are always silent within the class of relative pronouns.

4. Concluding remarks.

The situation sketched in section 2, where a maximally general description of German agreement facts led to a feature distinction which is covert in the class of nouns but overt in the classes of determiners and adjectives has been argued to be not uncommon. Feature systems typically have some redundancy, in the sense that not every combination of feature specifications picks out a different set of expressions.

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